

1 In Claim 51, at line 3 of the claim, insert --structure-- immediately
2 after "gate."

3 and at line 5 of the claim, insert --structure-- immediately
4 after "gate."

5
6 In Claim 52, at line ¹⁷~~15~~ of the claim, insert --laterally adjacent to
7 and-- before "covering." ¹⁷
NE

8
9 **REMARKS**

10 Claims 41-52 were pending in the application. Claims 41, 45 and
11 47-52 are amended. Claim 42 is canceled. It follows then that Claims
12 41 and 43-52 remain pending in the application.

13
14 **Claim Rejections Under 35 USC §102**

15 Claims 41, 42, 45, 46 and 50 stand rejected under 35 U.S.C.
16 §102(b), as being anticipated by Kurimoto (5,306,655). Claim 42 is
17 canceled without prejudice making the rejection of that claim moot.
18 Applicant traverses with respect to Claims 41, 45, 46 and 50 and
19 comments on Kurimoto with respect to independent Claim 52.

20 The Examiner states that Kurimoto teaches forming "barrier
21 sidewall nitride spacers 10 over sidewalls of the gate" (page 2, ¶1 of the
22 Office Action). While not specifically stated, Applicant assumes that the
23 Examiner believes that such nitride spacers 10 anticipate Applicant's

1 barriers or spacers 34 and 36 or perhaps the combination of
2 spacers 34/40 and 36/42. Applicant respectfully asserts that if such is
3 what the Examiner is alleging, that the Examiner is mistaken.

4 Claims 41, 45, 50 and 52, recite, in pertinent part and in varying
5 language, forming spacers adjacent a gate structure over a gate dielectric
6 layer adjacent the gate structure. Such claims also recite, in pertinent
7 part and in varying language, subsequently subjecting the gate structure,
8 sidewall spacers and gate dielectric layer to oxidizing conditions, where
9 a portion of the gate structure, laterally adjacent the spacers and at the
10 interface with the dielectric layer, is oxidized.

11 In contrast, Kurimoto oxidizes the gate structure prior to forming
12 any sidewall spacers. Such is seen in Fig. 13(b) and described in the
13 specification at col. 13, lines 42-44. Thus Kurimoto teaches forming an
14 intervening oxide layer between gate electrode 5f and the insulating
15 layer 10 shown formed in Fig. 13(c). Therefore, Kurimoto does not
16 teach forming oxidation resistant, non-oxide or nitride spacers adjacent
17 the gate as recited in Claims 41, 45, 50 and 52.

18 In addition. Applicant respectfully asserts that Kurimoto specifically
19 teaches the effect of such a different structure than that claimed by
20 Applicant, such a structure having the aforementioned intervening oxide
21 layer, at col. 13, lines 59-61. Here, Kurimoto states that “oxidation [of
22 the gate structure of Fig. 13(e)] is executed of the lower parts of the
23 right and left (vertical) side faces of the gate electrode 5f” which is

1 shown in Fig. 13(f). By comparing this pre-oxidation Fig. 13(e), to the
2 post oxidation Fig. 13(f) and then comparing the results of Kurimoto's
3 method with Applicant's Fig. 8, the striking difference in the results of
4 the different methods is evident. Therefore, unlike the result of
5 Applicant's method (shown in Fig. 8) where only that portion of the
6 gate electrode where such comes together with both dielectric layer 14
7 and spacers 34 and/or 36 is oxidized, in Kurimoto the sidewalls of gate
8 electrode 5f are oxidized. It is further noted that Applicant makes note
9 of such oxidation as taught by Kurimoto as being UNDESIRABLE (see,
10 page 10, line 19 to page 11, line 5).

11 Finally, Applicant notes that in the second of the two rejections
12 under §103, the Examiner includes Kumagai et al. to teach forming
13 "single sidewall spacers 16 on sidewalls of a gate 14" (page 3, ¶3 of the
14 Office Action). Applicant takes such inclusion as an admission that
15 Kurimoto is absent such a teaching. Thus Kurimoto, by the Examiner's
16 admission, does not teach all of the limitations of Claims 41, 45 and 50.

17 Applicant therefore asserts that Kurimoto, at least for the reasons
18 given, does anticipate Claims 41, 45 or 50 in the meaning of 35 U.S.C.
19 §102 as it does not teach or even suggest all of the limitations of the
20 methods recited therein. In addition, Kurimoto does not anticipate
21 Claim 46 which depends from Claim 45, for at least the same reasons.
22 It follows then that the rejection under §102 is in error and must be
23 withdrawn.

1 Claim Rejections Under 35 USC §103

2 *Kurimoto taken with Pintchovski et al.*

3 Claims 43 and 47 stand rejected under 35 U.S.C. 103(a), as being
4 unpatentable over Kurimoto (5,306,655) taken with Pintchovski et al.
5 (5,126,283 hereinafter “Pintchovski”). Applicant traverses.

6 The Examiner alleges that Kurimoto, applied as in the §102
7 rejection, teaches the method of Claims 43 and 47, lacking only forming
8 “a gate having a polysilicon, a conductive reaction barrier and an
9 overlying metal” (page 2, ¶2 of the Office Action). Applicant CANNOT
10 agree. Applicant has shown, above, that Kurimoto does not teach the
11 method of Claims 41 and 45, from which Claims 43 and 47 depend,
12 respectively. Specifically Kurimoto does not teach nor suggest forming
13 a nitride or oxidation resistant spacer adjacent the gate structure, but
14 rather teaches forming an intervening oxide layer. And rather than
15 teaching oxidizing only a portion of the gate where the gate, gate
16 dielectric and spacer come together, as shown in Fig. 8, Kurimoto
17 teaches oxidizing the vertical sidewalls of the gate as shown in
18 Fig. 13(f).

19 As the Examiner does not hold forth Pintchovski as teaching or
20 suggesting these deficiencies of Kurimoto, and as Pintchovski in fact does
21 NOT teach or suggest such deficiencies, Applicant respectfully asserts
22 that the combination of Kurimoto and Pintchovski CANNOT make
23 Applicant’s invention as recited in Claims 43 and 47 unpatentable in the

1 meaning of §103. It follows then that such rejection is in error and
2 must be withdrawn.

3

4 *Kurimoto taken with Pintchovski and further of Brigham et al. and*
5 *Kumagai et al.*

6 Claims 44, 48, 49, 51 and 52 stand rejected under 35 U.S.C.
7 103(a), as being unpatentable over Kurimoto (5,306,655) taken with
8 Pintchovski (5,126,283), as applied to claims 41-43, 45-47 and 50 above,
9 and further of Brigham et al. (5,714,413 hereinafter "Brigham") and
10 Kumagai et al. (5,430,313 hereinafter "Kumagai"). Applicant traverses.

11 As previously shown, the Examiner's application of Kurimoto alone
12 or Kurimoto taken with Pintchovski is flawed, as such fail to teach or
13 suggest all of the limitations of the independent Claims 41, 45, 50
14 and 52 from which Claims 44, 48-49 and 51 depend, respectively. For
15 the instant rejection, the Examiner includes Brigham and Kumagai to
16 teach forming double sidewall spacers and nitride sidewall spacers
17 adjacent the gate, respectively. Applicant again noting, that the
18 Examiner's inclusion of Kumagai to teach such a nitride spacer adjacent
19 the gate is taken as an admission that Kurimoto offers no such teaching.

20 However, Brigham like Kurimoto teaches oxidizing the gate prior
21 to forming sidewall spacers (Fig. 3B and the text at col. 8, lines 58-61),
22 and Kumagai teaches removing the gate dielectric adjacent the gate such
23 that the spacers of Kumagai are formed in contact with the substrate

(Figs. 4A and 4B, and the text at col. 3, line 61 to col. 4, line 3). As a result, oxidation of the structure of Bingham, as Kurimoto, will result in additional oxidation of the gate's sidewalls. Oxidation of the structure of Kumagai, on the other hand, will result in no oxidation of the gate what so ever, as Kumagai lacks the path for oxygen diffusion provided for in Applicant's claimed invention.

Kurimoto alone, or Kurimoto taken with Pintchovski, as previously shown, are deficient in teaching or suggesting all of the limitations of Applicant's Claims 41, 45, 50 and 52, from which Claims 44, 48-49 and 51 depend. Neither Brigham nor Kumagai are offered to, or in fact, correct these deficiencies, but rather are deficient in and of themselves as noted above. Therefore, Applicant respectfully asserts that no combination of Kurimoto, Pintchovski, Brigham or Kumagai can make Applicant's Claims 44, 48-49 and 51-52 unpatentable in accordance with the meaning of §103. Therefore the instant rejection is in error and must be withdrawn.

Summary

Applicant's response to the above-referenced Office Action has addressed each of the Examiner's rejections and objections and represents that each of Claims 41 and 43-52 are in condition for allowance. Action to this effect is earnestly sought. If the Examiner's next Office Action is anything other than a Notice of Allowance, however, the Examiner is



1 requested to telephone the undersigned to schedule a telephonic
2 conference.

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5 Respectfully submitted,

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7 Dated: Sept 25, 2000

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Bernard Berman

Reg. No. 37,279

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